

# **FHWA Workshop over the Web for Travel Model Development Session 3 Homework Solutions Estimating a Non-Logit Model**

**Identify the AM and PM peak hours for each purpose. That is, identify the one-hour time slots in the morning and evening time periods with the highest percentage of trips.**

## **Solution**

The AM and PM peak hours for each purpose are highlighted in the table below. The AM peak hours are highlighted in yellow and the PM peak hours in green.

### AM and PM Peak Hours by Purpose

Time of Day	Journey-to-Work Chain	HB School	HB Univ	HB Shop	HB Pickup and Drop-Off	HB Social Recreationa l	HB Other	Non Home-Based Work	Non Home-Based Non-Work	All Purposes
0:00 - 1:00	0.6%	0.0%	0.0%	0.4%	0.4%	0.5%	0.2%	0.0%	0.1%	0.3%
1:00 - 2:00	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%	0.1%	0.1%
2:00 - 3:00	0.2%	0.0%	0.0%	0.1%	0.1%	0.2%	0.0%	0.0%	0.1%	0.1%
3:00 - 4:00	0.6%	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%	0.2%
4:00 - 5:00	1.0%	0.0%	0.0%	0.1%	0.3%	0.2%	0.1%	0.0%	0.1%	0.3%
5:00 - 6:00	4.0%	0.2%	0.3%	0.3%	1.6%	0.4%	0.8%	0.2%	0.4%	1.4%
6:00 - 7:00	12.4%	14.7%	5.7%	0.9%	5.3%	0.9%	3.6%	0.2%	1.4%	6.7%
7:00 - 8:00	18.2%	29.6%	16.5%	1.5%	20.5%	1.4%	5.6%	1.1%	7.1%	13.0%
8:00 - 9:00	7.4%	8.9%	11.3%	1.5%	11.1%	4.0%	5.8%	2.6%	4.2%	6.4%
9:00 - 10:00	2.7%	1.0%	4.5%	5.5%	5.1%	4.3%	5.4%	2.8%	4.5%	3.8%
10:00 - 11:00	1.1%	0.0%	5.4%	6.8%	1.3%	3.3%	4.5%	4.7%	5.9%	3.0%
11:00 - 12:00	1.5%	0.4%	6.7%	7.7%	2.4%	4.1%	4.8%	18.1%	8.5%	4.4%
12:00 - 13:00	1.9%	0.4%	7.9%	7.3%	1.6%	4.1%	5.5%	30.3%	8.5%	5.1%
13:00 - 14:00	1.9%	0.5%	3.1%	7.6%	2.0%	4.8%	5.2%	18.5%	7.5%	4.4%
14:00 - 15:00	4.3%	22.1%	8.1%	6.9%	12.1%	3.0%	5.8%	9.0%	14.5%	9.5%
15:00 - 16:00	7.3%	15.8%	6.6%	8.9%	12.8%	4.6%	7.9%	5.1%	12.8%	9.6%
16:00 - 17:00	10.1%	2.5%	4.9%	8.7%	5.8%	6.3%	8.1%	3.3%	5.5%	6.9%
17:00 - 18:00	12.4%	2.3%	5.0%	8.0%	7.1%	9.2%	10.3%	1.8%	6.5%	8.3%
18:00 - 19:00	4.7%	0.9%	3.0%	9.9%	3.1%	14.6%	8.7%	1.3%	4.1%	5.5%
19:00 - 20:00	2.1%	0.3%	2.8%	9.6%	1.5%	12.1%	6.5%	0.7%	3.5%	3.9%
20:00 - 21:00	1.2%	0.1%	4.9%	4.0%	1.7%	9.4%	5.5%	0.0%	2.6%	2.8%
21:00 - 22:00	1.7%	0.1%	1.7%	3.2%	1.2%	8.0%	3.2%	0.0%	1.3%	2.1%
22:00 - 23:00	1.5%	0.1%	1.3%	0.9%	1.6%	3.1%	1.3%	0.2%	0.6%	1.2%
23:00 - 24:00	1.3%	0.0%	0.3%	0.3%	1.3%	1.4%	0.9%	0.2%	0.4%	0.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**Compare the peaking patterns of the journey-to-work and home-based school trips shown in the worksheet *Charts*. Do these peaking patterns make sense?**

Notice that the journey-to-work trips peak between 7:00 AM and 8:00 AM in the morning, and 5:00 PM and 6:00 PM in the afternoon. The school trips also peak between 7:00 AM and 8:00 AM in the morning. This is very much in line with our daily experience. In the PM, however, the School trips peak a lot earlier, between 2:00 PM and 3:00 PM. Once again, this seems to make sense. Most schools close for the day around this time period.

**Now compare the peaking patterns of the journey-to-work and home-based shopping trips. What do you observe? Is this consistent with your knowledge of these two types of trips?**

For the home-based shopping trips, even though we showed in the table that the AM peak occurs between 11:00 AM and 12:00 PM, this peak is not at all pronounced. In other words, the home-based shopping trips seem to be more or less uniformly spread out in the morning. This is also the case in the afternoon and the evening, although, more shopping trips seem to be made in the PM than in the AM.

Shopping trips, unlike work or education trips, are discretionary. They don't need to adhere to a set schedule, and therefore can and usually do happen throughout the day. Therefore, the patterns we observe make a lot of sense.

**Analyze the peaking pattern of the non home-based work trips. What do you observe? What do you think is the reason for the peaking pattern?**

The non home-base work trips are a very interesting trip category. They represent all trips that start and end at the work place. These could be errands made while at work, local business trips made with the work location as the base, or the daily lunch trips. We notice that most of these trips are concentrated between 12:00 PM and 1:00 PM. Once again, this is intuitive because most non home-based work trips tend to occur around the lunch time.

**In many travel demand models, modelers define so-called peak periods. These are usually defined as AM peak, PM peak or Off-peak. Note that these periods are usually not one-hour periods, but span a larger time frame. Looking at Chart 1 in the worksheet *Charts*, define the AM peak period, PM peak period and the Off-peak period.**

This could be a subjective exercise. Nonetheless, we all notice that the AM peak is a lot more pronounced than the PM peak. One way to define the peak periods could be as follows:

1. AM Peak Period: 7:00 AM – 8:00 AM
2. PM Peak Period: 3:00 PM – 6:00 PM
3. Off Peak Period: Everything else.